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September 6, 2016

Bill Hurlbut  
Groundwater/UIC Section, 6WQ-SG  
1445 Ross  
Dallas, TX 75202

**Re: Osage County, Oklahoma  
Disposal SI Request**

Dear Sir,

Enclosed for your review is Scout Energy Partners' response to shutting in five disposal wells disposing of water into the Arbuckle formation in Osage County, Oklahoma per the request received September 4, 2016. Please see attached request for reference and review the proposal and justification below.

Scout Energy Partners acquired the referenced disposal wells in July 2014 at which time disposal volumes for the referenced wells was approximately 16,000 bwpd. Since acquiring these disposal wells disposal volumes have been drastically reduced with disposal volumes for the 5 wells being just over 6,600 bwpd over the last 30 days. All five wells have been disposing of water on a vacuum since Scout Energy Partners took over operations averaging a 17-inch vacuum. The water disposed into these wells consists only of produced water from the leases in the immediate area operated by Scout Energy Partners. No frac water is being disposed of into any of the disposal wells.

Per the attached Oklahoma Corporation Commission (OCC) letter posted on their website, the OCC is requesting a managed shut-in of wells to be completed by September 13<sup>th</sup> for disposal wells within a 5 to 10-mile radius of the earthquake activity occurring on September 3<sup>rd</sup>. Per the attached map provided on the OCC website the 5 disposal wells in question would fall in the 5 to 10-mile radius. Scout Energy Partners has already taken steps to shut in higher water producers in an effort to decrease disposal volumes. However, given the data presented above and the location of the 5 wells in question being along the outer limit of the area highlighted by the OCC, Scout Energy Partners does not believe the 5 wells in question to be contributing to the dramatic increase in earthquakes in the area. Therefore, Scout Energy Partners requests that the 5 wells in question be exempt from the shut in request.

If you have any questions or comments, please feel free to contact me at (972) 865-7605.

Sincerely,

A handwritten signature in black ink that reads "Nick Tunnell". The signature is fluid and cursive, with the first name "Nick" and last name "Tunnell" clearly distinguishable.

Nick Tunnell  
Senior Engineer  
Scout Energy Partners

Attachments

## Nick Tunnell

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**From:** Hurlbut, Bill <Hurlbut.William@epa.gov>  
**Sent:** Sunday, September 4, 2016 7:15 PM  
**To:** ntunnell@scoutep.com  
**Cc:** Dellinger, Philip; Dorsey, Nancy  
**Subject:** Shutin Request

Nick,

I appreciate your call. We are requesting due to increased seismic activity that you shutin the following wells:

#6009 7D NW 22 24 06 - Scout Energy – 150 psi-SI – Tim Lytle – 918 613-9366 -SI  
#6056 2-17 NE 17 24 06 - Scout Energy – 200 psi - SI– Tim Lytle -918 613-9366 -SI  
#6063 6D-9 NE 9 24 06 - Scout Energy – 200 psi - SI– Tim Lytle -918 613-9366 – SI  
#6170 15-32 SE 32 25 06 Scout Energy - 200 psi - SI– Tim Lytle - 918 613-9366 -SI  
#6196 1-S SE 5 24 05 Scout Energy - 0 psi - SI– Tim Lytle - 918 613-9366 –SI

Thank you.

*Bill Hurlbut, Geologist*

Bill Hurlbut  
Groundwater/ UIC Section, 6WQ-SG  
1445 Ross  
Dallas, Texas 75202  
214-665-8305 work  
214-665-2191 fax  
hurlbut.william@epa.gov

OKLAHOMA  
**CORPORATION COMMISSION**  
P.O. BOX 52000  
OKLAHOMA CITY, OKLAHOMA 73152-2000

253 Jim Thorpe Building  
Telephone: (405) 521-2240  
FAX: (405) 521-3099  
www.occeweb.com

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**OIL & GAS CONSERVATION DIVISION**



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**Tim Baker, Director**

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TO:

From: Tim Baker

RE: Reduction of volumes for Arbuckle disposal wells located in the Area of Interest for  
Triggered Seismicity

Pawnee Area

Date: Sept.3, 2016

The Commission's Oil and Gas Division (OGCD) is exercising its authority pursuant to 17 O.S. Sec. 52, 52 O.S. Sec. 139 (D) (1) and OAC 16: 10-5-7(g) to respond to an emergency situation having potentially critical environmental or public safety impact resulting from the operation of saltwater disposal wells.

The affected area highlighted on the attached map was previously designated as an area of interest based upon the dramatic increase in earthquakes within the immediate area. The OGCD has reviewed the report of earthquake activity of magnitude 5.6 MW as reported by the Oklahoma Geological Survey (OGS) on Saturday Sept. 3<sup>rd</sup>, 2016. The reported earthquake activity constitutes an emergency situation. The following instructions pertain to your operations within the designated area of interest and affect the wells listed below. These instructions are mandatory and to be implemented immediately.

The following schedule applies to all wells within the defined zone in the Area of Interest:

Zero to 5 miles ( 0-5 miles ):

A managed shut-in of wells currently authorized to inject, to be completed on or before Sept. 10<sup>th</sup>, 2016.

Five to ten miles ( 5-10 ):

A managed shut-in of wells currently authorized to inject, to be completed by Sept. 13<sup>th</sup>, 2016.

The actions directed in this letter will be reviewed as more information becomes available. Subsequent actions may be necessary if the data warrants such action.

Objections to this action must be submitted in writing by email to Charles Lord or Jim Marlatt at the email address listed below, or at the address or facsimile number indicated in the letterhead. Failure to comply may result in formal legal action by the OGCD.

If you have any questions, contact the OGCD:

Charles Lord  
405- 522-2751

[c.lord@occemail.com](mailto:c.lord@occemail.com)

or

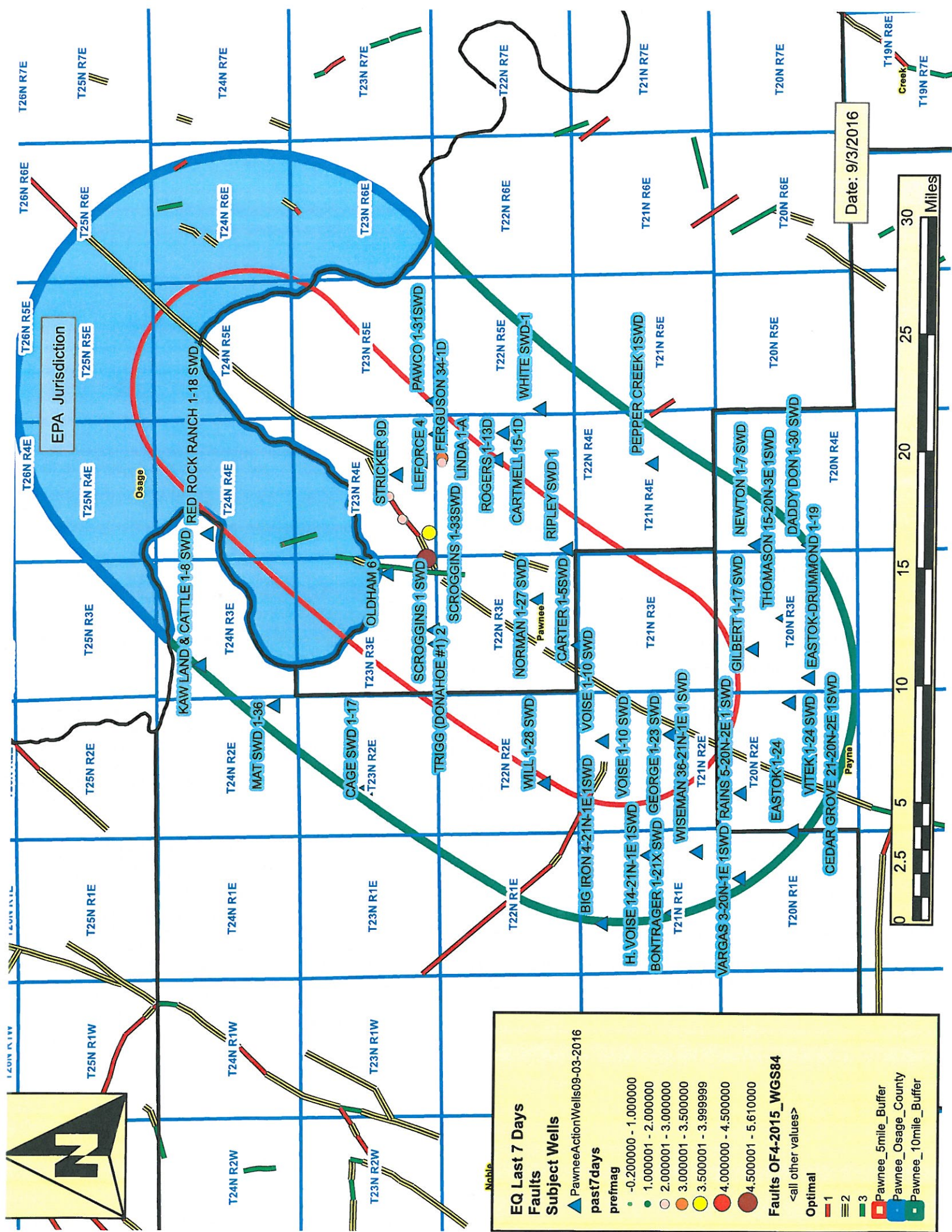
Jim Marlatt  
405- 522-2758

[j.marlatt@occemail.com](mailto:j.marlatt@occemail.com)

Sincerely,

Tim Baker, Director  
Oil and Gas Conservation Division





## Dorsey, Nancy

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**From:** William S Leith <wleith@usgs.gov>  
**Sent:** Wednesday, September 07, 2016 3:50 PM  
**To:** Michael Teague; Jeremy Boak; Charles Lord; Tom Robins; Julie Shemeta; Keli.Cain@oem.ok.gov; kyle.murray@ou.edu; Dellinger, Philip; Dorsey, Nancy; Coleman, Sam; mary.hale@bia.gov; sid.caesar@bia.gov; patrick.vacha@bia.gov; Robert Detrick; Bob Woodward  
**Cc:** William Andrews; Dan McNamara; Scott Bennett; Mike Blanpied; Lind Gee; Steve Hickman; Justin Rubinstein; Elizabeth Cochran; Jill McCarthy; Cecily Wolfe; Dave Wilson; Keith L Knudsen; Robert A Williams; David Applegate; Harley Benz; Paul Earle; Dave Wald; Nick Beeler; Austin Holland; Jason De Cristofaro; Art McGarr  
**Subject:** Pawnee earthquake update: change in USGS magnitude estimate, aftershock deployments, resource links  
**Attachments:** USGS\_FINAL\_Pawnee+PragueMagnitudeUpdates.pdf; ATT00001.htm  
**Importance:** High

Colleagues,

Below are brief updates of USGS activities, and the activities of other organizations, related to the Pawnee, Oklahoma, earthquake. I encourage you all to share any additional information that may be useful to this group.

—Bill Leith  
USGS Senior Science Advisor for  
Earthquake and Geologic Hazards

### Seismic Magnitude Updates

This afternoon, the USGS issued a [media release](#) updating the magnitudes of the Pawnee (Sept. 3, 2016) and Prague (Nov. 2011) Oklahoma earthquakes. The USGS “official” magnitude of the Pawnee earthquake will be raised to M5.8, making it the largest recorded earthquake in Oklahoma; the magnitude of the 2011 Prague earthquake will be raised to M5.7. The media release (which I will send to this email group when it is final) explains the reasons for the change, which are technical and also consistent with the policies and procedures of the USGS National Earthquake Information Center.

Note that if the Pawnee earthquake is also, in the future, judged to have been induced by wastewater injection, it will then also be the largest injection-induced earthquake, worldwide. However, to make that judgement, data will be needed on the injection histories of wastewater injection wells in the epicentral area and surrounding region. Because of the significance of the Pawnee earthquake, it is important to make strong efforts to secure these injection data. Also important to maximize the knowledge gain of our scientific investigations will be to obtain any existing geologic, geophysical, hydrologic, imaging and stress data that may have been acquired previously in the epicentral region.

### Field Deployments for Aftershock Recording:

By the end of the day on Monday Sept. 5th, 11 University of Oklahoma (OU) stations had been installed in the epicentral region, along with 13 university stations. More are planned.

By the end of the day on Tuesday Sept. 6th, three real-time USGS stations have also been installed. An OGS seismologist (Jefferson Chang) was notified of these new stations.

Monty Matlock of the Pawnee Nation was contacted with regard to aftershock deployments. They are interested in keeping informed of our progress.

Beginning today, Wednesday, Jason De Cristofaro (USGS Pasadena office) will be working with Katie Keranen (Cornell University) to bring some of her non-telemetered stations online. Priority will be the broadband stations and the accelerometers close-in to the main shock. This effort is also being coordinated with OU (Niro Nakata) and IRIS (Kent Anderson).

#### Pawnee Earthquake Resources:

OGS Pawnee Earthquake Fact Sheet

[http://www.ou.edu/content/dam/ogs/documents/statements/OGS-Fact\\_Sheet\\_Pawnee\\_Earthquake\\_2016-09-03.pdf](http://www.ou.edu/content/dam/ogs/documents/statements/OGS-Fact_Sheet_Pawnee_Earthquake_2016-09-03.pdf)

USGS Pawnee event pages:

<http://earthquake.usgs.gov/earthquakes/eventpage/us10006jxs#executive>

USGS Aftershock Forecast

Is now posted to the event page in the Tectonic Summary section, and will be updated later this week.

Seismic Strong Motion Data (the larger ground accelerations)

[http://strongmotioncenter.org/cgi-bin/CESMD/iqr\\_dist\\_DM2.pl?iqrID=PawneeOklahoma\\_03Sep2016\\_us10006jxs&SFlag=0&Flag=1](http://strongmotioncenter.org/cgi-bin/CESMD/iqr_dist_DM2.pl?iqrID=PawneeOklahoma_03Sep2016_us10006jxs&SFlag=0&Flag=1)

Earthquake Engineering Research Institute "virtual clearinghouse":

<http://www.eqclearinghouse.org/2016-09-03-oklahoma/>

William Leith, Ph.D.  
Senior Science Advisor for Earthquake  
and Geologic Hazards  
U.S. Geological Survey  
905 National Center, Reston VA 20192  
tel 703-648-6786  
[if it's really urgent, don't use email]



## Dorsey, Nancy

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**From:** Tom Robins <Tom.Robins@ee.ok.gov>  
**Sent:** Wednesday, September 07, 2016 10:41 AM  
**To:** Tyler Powell  
**Cc:** Coleman, Sam; Dellinger, Philip; Honker, William; Dorsey, Nancy; Lane, Willie; Saunders, Jerry; Blevins, John; Payne, James; Tim Baker  
**Subject:** Re: UIC Well Data

We are at the Oklahoma Geological Survey Seismicity workshop today but spoke to Tim Baker and we can during a break grab everyone and get on a call. We have a break at 2:45pm if that works and someone can provide a conference call number and code for us to dial into

Sent from my iPhone

On Sep 6, 2016, at 8:51 PM, Tyler Powell <[Tyler.Powell@ee.ok.gov](mailto:Tyler.Powell@ee.ok.gov)> wrote:

Thanks Sam for your call today, we really want to move forward working together to share our tools. I've copied Tim Baker with the Corporation Commission and Tom Robins with our office. I'll leave it to Tim to toss out some time in the next day or so when we can do a phone call. This will let the technical staffs work understand what our tools are and how we can share data and results.

Thanks!

Tyler Powell  
Deputy Secretary of Environment  
State of Oklahoma

Sent from my iPhone

On Sep 6, 2016, at 5:42 PM, Coleman, Sam <[Coleman.Sam@epa.gov](mailto:Coleman.Sam@epa.gov)> wrote:

The EPA staff that can best discuss the technical approaches to sharing data are:  
Phillip Dellinger  
Nancy Dorsey  
Willie Lane

We would like to explore the opportunities to share data and tools regarding injection wells and their relationship to seismic activity, however, we recognize that we need to work on some Tribal sensitivities regarding how this will be done. We will have some separate conversation with BIA and DOI Solicitor staff regarding this issue as well.

Samuel Coleman, P.E.  
Deputy Regional Administrator  
EPA Region 6  
[coleman.sam@epa.gov](mailto:coleman.sam@epa.gov)  
214.665.2100 Ofc  
214.665.3110 Direct  
214.789.2016 Cell





## Dorsey, Nancy

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**From:** Tyler Powell <Tyler.Powell@ee.ok.gov>  
**Sent:** Tuesday, September 06, 2016 8:52 PM  
**To:** Coleman, Sam  
**Cc:** Dellinger, Philip; Honker, William; Dorsey, Nancy; Lane, Willie; Saunders, Jerry; Blevins, John; Payne, James; Tom Robins; Tim Baker  
**Subject:** Re: UIC Well Data

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## **Dorsey, Nancy**

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**From:** Nick Tunnell <ntunnell@scoutep.com>  
**Sent:** Tuesday, September 06, 2016 1:35 PM  
**To:** Hurlbut, Bill  
**Cc:** Dellinger, Philip; Dorsey, Nancy; 'Kevin Rathke'; 'Kim Brand'  
**Subject:** RE: Shutin Request  
**Attachments:** Disposal SI Request Letter.pdf

Bill,

Please see attached letter in response to the shut in request you sent me Sunday. Thanks.

### **Nick Tunnell**

Senior Engineer  
Scout Energy Partners  
4901 LBJ Freeway, Suite 300  
Dallas, TX 75244  
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Mobile: 972-951-8797  
[ntunnell@scoutep.com](mailto:ntunnell@scoutep.com)  
[www.scoutep.com](http://www.scoutep.com)

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**From:** Hurlbut, Bill [mailto:Hurlbut.William@epa.gov]  
**Sent:** Sunday, September 4, 2016 7:15 PM  
**To:** ntunnell@scoutep.com  
**Cc:** Dellinger, Philip <dellinger.philip@epa.gov>; Dorsey, Nancy <Dorsey.Nancy@epa.gov>  
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Thank you.

*Bill Hurlbut, Geologist*

Bill Hurlbut  
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Dallas, Texas 75202  
214-665-8305 work  
214-665-2191 fax  
[hurlbut.william@epa.gov](mailto:hurlbut.william@epa.gov)



# Magnitudes for Oklahoma Earthquakes Shift Upward

## Revisions follow standard USGS re-analysis

The U.S. Geological Survey is updating the official magnitude of the [September 3, 2016 Pawnee, Oklahoma earthquake](#) to Mw 5.8 (from 5.6), making it Oklahoma's largest recorded earthquake to date.

The magnitude revision is based on further in-depth analysis of seismic recordings. Changes in estimated magnitude for an earthquake are common in the hours-to-days following the event, as more data are analyzed in greater detail than is possible in the first minutes after the earthquake occurs.

Concurrently, the USGS is also updating the official magnitude of the [November 6, 2011 Prague, Oklahoma earthquake](#) to Mw 5.7 (from 5.6). Questions regarding their relative size prompted a re-analysis of both earthquakes. Both updates are the result of comprehensive studies of the long-period, globally-recorded seismic data for these earthquakes, using consistent approaches and datasets for each event.

"USGS analyses indicate that the two earthquakes are very similar in size - to within typically-cited uncertainties of 0.1 magnitude units," said Gavin Hayes, USGS research geophysicist. "However, the 2016 Pawnee event is slightly larger than the Prague earthquake in 2011," noted Hayes.

"While the difference in size between the two events is less than 0.1 magnitude units," Hayes continued, "rounding magnitudes to one decimal place means that the magnitude of the Prague earthquake is Mw 5.7, and the Pawnee earthquake is Mw 5.8."

Precisely ranking the largest earthquakes in Oklahoma is difficult because seismic instrumentation has vastly improved over the last several decades. Other large, documented and felt earthquakes in Oklahoma include an instrumentally recorded 1952 event centered near El Reno, to which magnitudes of 4.9 to 5.7 have been assigned. Before the instrumental era, an 1882 earthquake in southern Oklahoma has magnitude estimates ranging from 4.8 to 5.7, based on the area over which it was felt.

Magnitude estimates can vary for a variety of reasons, including differences in methods used to compute magnitude, differences in data used, uncertainties in that data, differences in how that data is processed, and differences in our assumptions about the Earth structure through which seismic waves travel.

For more background on differences in magnitude, see "[Why do USGS magnitudes differ from those published by other agencies?](#)"